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PRE-APPEAL BRIEF REQUEST FOR REVIEW

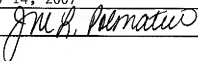
Docket Number (Optional)

MTI-31041-A

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on May 14, 2007

Signature



Typed or printed name

Jere L. Polmatier

Application Number

Filed

10/046,49710/26/01

First Named Inventor

Ping et al.

Art Unit

2814

Examiner

Thao X. Le

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).

Note: No more than five (5) pages may be provided.

I am the

☐

applicant/inventor.

☐

assignee of record of the entire interest.

See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.
(Form PTO/SB/96)

☒

attorney or agent of record.

Registration number 34259☐

attorney or agent acting under 37 CFR 1.34.

Registration number if acting under 37 CFR 1.34 _____



Signature

Kristine M. Strodthoff

Typed or printed name

414-273-2100

Telephone number

May 14, 2007

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☐

*Total of _____ forms are submitted.

This collection of information is required by 35 U.S.C. 132. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.8. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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PATENT

MAIL STOP AF
Attorney Docket No. MTI-31041-A

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Ping, et al.
Serial No. : 10/046,497
Filing Date : October 26, 2001
For : Method For Forming Raised Structures by Controlled Selective Epitaxial Growth of Facet Using Spacer
Group Art Unit: 2814
Examiner : LE, Thao X.
Confirmation No.: 8624

CERTIFICATION OF SUBMISSION

I hereby certify that, on the date shown below, this correspondence is being transmitted via the Patent Electronic Filing System (EFS) addressed to Examiner LE at the U.S. Patent and Trademark Office.

Date: May 14, 2007

Gu B. Palmatic

MAIL STOP AF
Commissioner for Patents
P.O. Box 1450
Arlington, VA 22313-1450

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Sir:

These comments accompany the Pre-Appeal Brief Request for Review filed concurrently with the Notice of Appeal in the above-identified application.

Remarks

Claims 143-155, 167-193 and 196-232 are pending.

Claims 143-148, 167-169, 173-175, 182-189, 197, 224 and 227-231 are presently under consideration.

In brief, the issue of this Appeal is whether the Examiner has a) properly established a case of anticipation and obviousness of the claims, b) properly withdrawn certain claims, and c) erroneously discounted process limitations of product-by-process claims.

The Examiner has made a final rejection of the claims, as follows:

Claims 143-144, 147, 167, 169-170, 173, 175, 182-189, 197 and 227-231 under Sections 102(b)/103(a) as anticipated by or obvious over *Matsumoto* (JP 401286361);

Claims 145-146, 148, 168 and 174 under Section 103(a) as obvious over *Matsumoto* (JP 401286361) in view of *Sharma* (USP 5,483,094).

The basis of the Examiner's rejections is that the references describe a structure composed of multiple epitaxial (SEG) layers, with each epitaxial layer having a surface comprising a plurality of facets.

In the Final Action (mailed March 14, 2007), in response to Applicant's request for support in the text of *Matsumoto* for the Examiner's position that the references describes a second SEG layer as claimed, the Examiner stated *Matsumoto* shows two SEG layers 4, 6, in Fig. 3 and that "No additional text is necessary."

Applicant believes that the rejections of the claims are in error because the Examiner has based his rejection of the claims solely on the figures of *Matsumoto*, while ignoring the facts clearly stated by that reference.

Rejection of Claims based on Matsumoto (JP 401286361). The Examiner cites to "layers" 4, 6 in Fig. 3(b), and asserts that *Matsumoto* shows *two* distinct epitaxial (SEG) layers. The Examiner has ignored the statements of *Matsumoto* regarding elements 4, 6.

Matsumoto in the Abstract describes growing a single SEG layer 4 in Fig. 3(b). The Abstract also states that **IF boron is then implanted into layer 4 – uniform base 6 is formed.**

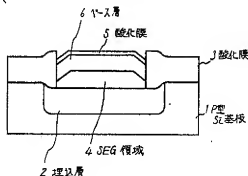


FIG. 3(b)

Abstract of JP1286361 (Emphasis added.)

CONSTITUTION: ...a phosphorus doped N type SEG (selective epitaxial growth) area 4 is grown. And an oxide film 5 is grown on the SEG area 4. Next, an insulating film 8 is formed by a rotary application method. Since applied film is formed thick on a facet 7 at the corner part of the

SEG area 4 this way and the entire surface of the SEG area 4 is planed, if boron is implanted by an ion implanting method, uniform base 6 is formed. ...

The Examiner has ignored Matsumoto's written description of doping SEG area 4 to form doped area 6 – and incorrectly interpreted Fig. 3(b) of that reference as the basis for the rejection of the claims. Matsumoto discloses a single SEG layer 4. Area 6 is not a second SEG layer – it is a portion of SEG layer 4 that is doped after layer 4 is formed.

The Examiner's rejections of the claims based on Matsumoto are without support. Matsumoto does not anticipate or suggest Applicant's devices as claimed.

Rejection of Claims based on Matsumoto with Sharma. The Examiner rejected *dependent* Claims 145-146, 148, 154-155, 168, 171, 174, 177, and 180 based on the combination of Matsumoto with Sharma (USP 5,483,094). The Examiner cites Sharma for teaching an insulative layer 41/61 composed of silicon oxide and/or silicon nitride, and a dielectric layer having a 2-5nm thickness.

Additional information from Sharma does not overcome the failure of Matsumoto to teach a device having *multiple* overlying epitaxial silicon layers, as discussed above.

Examiner's Withdrawal of Claims is without basis. In response to the Examiner request for restriction of species, Applicant elected Species subgroup "b" relating to FIGS. 2A-2F with a listing of Claims 143-155, 167-193 and 196-232. However, within the group of elected claims, the Examiner has now withdrawn Claims 149-155, 170-172, 176-181, 190-193, 196 and 198-226 *without explanation or reasoning*.

Applicant again submits that all of the listed claims correspond to and include all of the limitations of the elected species FIGS. 2A-2F, which illustrate a vertical structure (e.g., transistor) and raised adjacent structures (e.g., source/drain) with multiple epitaxial silicon layers, as shown below.

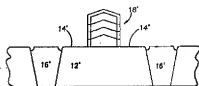


FIG. 2E

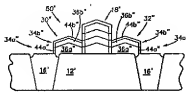


FIG. 2F

All of the withdrawn claims should properly be under consideration by the Examiner.

Examiner's Statements re. process limitations in claims. In the Final Action (para. 6), the Examiner responded to Applicant's arguments, as follows:

6...It is apparent that Applicant's argument relies on the different method between Matsumoto and present invention. However, the patentability of a product does not depend on its method of production. If the product in the product-by-process claim...

None of Claims 143-155, 167-193 and 196-232 currently under consideration recites any process limitations. Those claims are product claims with structural characteristics that clearly define over the cited prior art. Applicant does not rely on the process of making the claimed structures for patentability.

Product-by-process claims. "Product-by-process" claims 203-223 have been withdrawn by the Examiner as "non-elected species" (which Applicant traverses).

As stated by the Examiner (Office Action mailed December 22, 2006):

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim...

The Examiner has acknowledged that Claims 143, 173, 182, 186, 197, 227, 229 and 230 are considered to be generic. (Final Office Action mailed March 14, 2007).

The position of the Examiner that *no weight* is given to the process limitations of a product-by-process claim is clearly in error. It is well established that, to the extent these process limitations distinguish the product over the prior art, they must be given the same consideration as traditional product characteristics. *In re Luck*, 177 USPQ 523, 525 (CCPA 1973); *In re Hallman*, 210 USPQ 609, 611 (CCPA 1981). The process limitations in Claims 203-223 distinguish Applicant's devices over the prior art – and must be considered by the Examiner.

The "product-by-process" claims 203-223 recite forming the claimed structures by:

- selectively growing a first faceted epitaxial silicon layer on a substrate;
- depositing an insulative layer over the first epitaxial layer;
- removing a portion of the insulative layer to expose the surface of the first epitaxial layer;
- selectively growing a second faceted epitaxial silicon layer on the first epitaxial layer;
- depositing an insulative layer over the epitaxial layers.

Unlike the prior art, Applicant selectively grows overlying epitaxial silicon layers on a substrate – without the benefit of a confined space (i.e., an opening in an insulative layer). This is problematic due to the different oriented facets (i.e., (100), (110), (111)) that form on an epitaxial

silicon layer. If additional epitaxial layers are grown to add height (without being confined in an opening), such growth will also occur on exposed facets in a lateral (horizontal) direction, resulting in short circuiting of nearby devices. Applicant's process builds vertical structures on a substrate that are not contained within an opening by depositing an insulative layer over each epitaxial layer after it is formed and then exposing the top surface of the layer to provide a substrate for vertical growth while eliminating lateral growth of a subsequent silicon layer.

Compared to Matsumoto (and Sharma), the structures from Applicant's process will have:

- Separate overlying epitaxial silicon layers -- each with a faceted top surface; and
- The lower (first) epitaxial layer with a *thicker* insulative sidewall layer than the upper (second) epitaxial layer -- from depositing the second insulative layer. The first epitaxial layer bears a previously deposited insulative layer while the second epitaxial layer does not.

The process limitations in Claims 203-223 should be considered by the Examiner.

In sum, the Examiner has a) ignored the express teaching of the primary reference (Matsumoto) and has failed to provide proper support for his rejection of the claims, b) has improperly withdrawn certain claims, and c) has erroneously discounted process limitations of product-by-process claims.

Extension of Term. The proceedings herein are for a patent application and the provisions of 37 CFR § 1.136 apply. Applicant believes that no extension of term is required, but conditionally petitions for an extension of time if so required. If any extension and/or fee are required, please charge Account No. 23-2053.

It is submitted that the present claims are in condition for allowance, and notification to that effect is respectfully requested.

Respectfully submitted,



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Dated: May 14, 2007

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